

Appl. No. 10/799,309
Reply to Office Action of December 27, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): A light-emitting device comprising:

a light-emitting device main body having a light output surface and transferred, and
a transparent electrode formed in a size larger than a size of the light output surface so as to cover the light output surface and connected directly to a whole area of the light output surface,

wherein the transparent electrode provides direct connection between a wiring for supplying electric power to the light-emitting device main body, and wherein the wiring is formed outside the region of the light output surface.

Claim 2 (cancelled).

Claim 3 (previously presented): A light-emitting device comprising:

a light-emitting device main body having a light output surface, and
a transparent electrode formed in a size larger than a size of the light output surface so as to cover the light output surface, wherein

the light-emitting device main body is provided in the form of a chip that includes a plurality of semiconductor layers, and wherein

the transparent electrode is connected directly to a whole area of the light output surface.

Claim 4 (previously presented): The light-emitting device as set forth in claim 3, wherein the transparent electrode is connected to the light output surface through a contact layer, wherein a size of the contact layer is minute relative to the size of the light output surface.

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Claim 5 (previously presented) The light-emitting device as set forth in claim 37, wherein the refractive index of the transparent electrode is lower than the refractive index of the semiconductor layer including the light output surface and is higher than the refractive index of a resin layer provided on the upper side of a transparent electrode.

Claim 6 (previously presented): The light-emitting device as set forth in claim 3, wherein the transparent electrode is a light-transmitting resin containing one or more conductive particulates dispersed therein.

Claim 7 (original): The light-emitting device as set forth in claim 6, wherein the conductive particulates scatter light emitted from the light output surface and diffuse the light from the transparent electrode to an exterior of the device.

Claim 8 (original): The light-emitting device as set forth in claim 6, wherein the conductive particulates include indium tin oxide.

Claim 9 (original): A light-emitting device comprising:
a light-emitting device main body having a light output surface, and
a transparent electrode formed in a size larger than a size of the light output surface so as to cover the light output surface and connected directly to a whole area of the light output surface.

Claim 10 (currently amended): A semiconductor light-emitting apparatus comprising:

a plurality of light-emitting device main bodies each having a light output surface and transferred, and

a transparent electrode formed to be larger in size than the light output surfaces so as to cover the light output surfaces and connected directly to a whole areas of the light output surfaces.

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Claim 11 (currently amended): The semiconductor light-emitting apparatus as set forth in claim 10, wherein the transparent electrode is formed collectively on the light output surfaces of the plurality of light-emitting device main bodies.

Claim 12 (currently amended): The semiconductor light-emitting apparatus as set forth in claim 10, wherein the transparent electrode is formed by coating the light output surfaces with a paste containing one or more conductive particulates dispersed in a light-transmitting resin.

Claim 13 (currently amended): The semiconductor light-emitting apparatus as set forth in claim 12, wherein the conductive particulates scatter light emitted from the light output surfaces and diffuse the light from the transparent electrode to an exterior of the apparatus.

Claim 14 (currently amended): An image display apparatus comprising an image display surface formed by arranging a plurality of light-emitting devices on an apparatus substrate, each of the light-emitting devices comprising a light-emitting device main body having a light output surface and transferred, and a transparent electrode formed in a size larger than a size of the light output surface so as to cover the light output surface and connected to whole area of the light output surface through a contact layer, wherein a size of the contact layer is ~~minute~~ relative to less than the size of the light output surface.

Claim 15 (withdrawn): A method of manufacturing a light-emitting device, the method comprising the steps of:

transferring a light-emitting device main body having a light output surface onto a resin portion so as to expose the light output surface;

forming a resist film on the light output surface and the surface of the resin portion;

providing the resist film with an opening portion larger in size than the light output surface so that the opening portion fronts on the light output surface; and

forming a transparent electrode in the opening portion so that the transparent electrode is connected directly to an area of the light output surface.

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Claim 16 (withdrawn): The method of manufacturing a light-emitting device as set forth in claim 15, wherein the opening portion is so formed as to front on a wiring for supplying electric power to the light-emitting device main body, and the light output surface and the wiring are connected directly to each other through the transparent electrode.

Claim 17 (withdrawn): A method of manufacturing a light-emitting device, the method comprising the steps of:

forming a resist film on a light output surface of a light-emitting device main body;

providing the resist film with an opening portion larger in size than the light output surface so that the opening portion fronts on the light output surface; and

forming a transparent electrode in the opening portion so that the transparent electrode is connected directly to a whole area of the light output surface.

Claim 18 (withdrawn): A method of manufacturing an image display apparatus, the method comprising the steps of:

transferring a plurality of light-emitting device main bodies each having a light output surface onto a resin portion so as to expose the light output surfaces;

forming a resist film on the light output surfaces and the surface of the resin portion;

providing the resist film with an opening portion larger in size than the light output surfaces so that the opening portion fronts on the light output surfaces; and

forming a transparent electrode in the opening portion so that the transparent electrode is connected directly to an area of the light output surfaces.

Claim 19 (withdrawn): The method of manufacturing an image display apparatus as set forth in claim 18, wherein the opening portion is so formed as to front on a wiring for supplying electric power to the plurality of light-emitting device main bodies, and the light output surfaces and the wiring are connected to each other collectively through the transparent electrode.

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Claim 20 (original): A light-emitting apparatus comprising:
a light-emitting device comprising a light-emitting device main body having a light output surface and transferred, and a contact metal formed on the light output surface;
a wiring layer formed outside the region of the light output surface; and
a transparent electrode so formed as to cover the contact metal and the wiring layer.

Claim 21 (original): The light-emitting apparatus as set forth in claim 20, wherein the transparent electrode is formed in a size larger than a size of the light output surface and connected directly to a whole area of the light output surface.

Claim 22 (original): The light-emitting apparatus as set forth in claim 20, wherein the surface, making contact with the transparent electrode, of the contact metal is formed of a noble metal.

Claim 23 (original): The light-emitting apparatus as set forth in claim 20, wherein the surface, making contact with the transparent electrode, of the wiring layer is formed of a noble metal.

Claim 24 (original): The light-emitting apparatus as set forth in claim 20, further comprising a protective resin layer so formed as to cover the transparent electrode.

Claim 25 (original): The light-emitting apparatus as set forth in claim 24, further comprising a diffusion preventive layer for preventing mutual diffusion of a component of the protective resin layer and a component of the transparent electrode, between the protective resin layer and the transparent electrode.

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Claim 26 (withdrawn): A method of manufacturing a light-emitting apparatus the method comprising the steps of:

transferring a light-emitting device main body having a light output surface onto a resin portion so as to expose the light output surface;

forming an electrode separation wall on the surface of the resin portion;

providing the electrode separation wall with an opening portion larger in size than the light output surface so that the opening portion fronts on the light output surface;

forming a wiring layer on a surface of the resin portion in an inside of the opening portion; and

forming a transparent electrode in the opening portion so that the transparent electrode is connected directly to a contact metal formed on the light output surface and to the wiring layer.

Claim 27 (withdrawn): The method of manufacturing a light-emitting apparatus as set forth in claim 26, wherein the wiring layer is formed outside the region of the light output surface.

Claim 28 (withdrawn): The method of manufacturing a light-emitting apparatus as set forth in claim 26, wherein after a transparent electrode material is so applied as to cover the opening portion and the electrode separation wall and is hardened, the transparent electrode material is polished to expose the surface of the electrode separation wall, thereby forming the transparent electrode.

Claim 29 (withdrawn): The method of manufacturing a light-emitting apparatus as set forth in claim 26, wherein the transparent electrode is formed by jetting a transparent electrode material to the opening portion by an ink jet technique, and hardening the transparent electrode material.

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Claim 30 (withdrawn): The method of manufacturing a light-emitting apparatus as set forth in claim 26, wherein the transparent electrode is formed by applying a transparent electrode material to the opening portion by screen printing, and hardening the transparent electrode material.

Claim 31 (withdrawn): The method of manufacturing a light-emitting apparatus as set forth in claim 26, wherein a plurality of the light-emitting device main bodies are transferred onto the resin portion, and the transparent electrode is formed collectively so as to cover contact metals formed on the light output surfaces of a plurality of the light-emitting devices.

Claim 32 (withdrawn): The method of manufacturing a light-emitting apparatus as set forth in claim 26, wherein the wiring layer is formed by forming a metallic layer in an inside of the opening portion, and thereafter laminating a noble metal layer on the metallic layer.

Claim 33 (withdrawn): The method of manufacturing a light-emitting apparatus as set forth in claim 26, further comprising a step of forming a protective resin layer for protecting the transparent electrode, so as to cover the transparent electrode.

Claim 34 (withdrawn): The method of manufacturing a light-emitting apparatus as set forth in claim 33, further comprising a step of forming a diffusion preventive layer for preventing mutual diffusion of a component of the protective resin layer and a component of the transparent electrode, on the surface of the transparent electrode.

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Claim 35 (currently amended): An image display apparatus comprising an image display surface formed by arranging a plurality of light-emitting apparatuses on an apparatus substrate, each of the light-emitting apparatuses comprising a plurality of light-emitting devices each of which comprises a light-emitting device main body having light output surface and transferred, and a contact metal formed on the light output surface; a wiring layer formed outside the regions of the light output surfaces; and a transparent electrode so formed as to cover the contact metals and the wiring layer, wherein a size of the contact metal is ~~minute relative to~~ less than a size of the light output surface.

Claim 36 (withdrawn): A method of manufacturing an image display apparatus, comprising the steps of:

transferring a plurality of light-emitting device main bodies each having a light output surface onto a resin portion so as to expose the light output surfaces;

forming an electrode separation wall on a surface of the resin portion;

providing the electrode separation wall with an opening portion larger in size than the light output surfaces so that the opening portion fronts on the light output surfaces;

forming a wiring layer on a surface of the resin portion in an inside of the opening portion; and

forming a transparent electrode in the opening portion so that the transparent electrode is connected directly to contact metals formed on the light output surfaces and to the wiring layer.

Claim 37 (currently amended): The light-emitting device as set forth in claim 3_6, wherein a resin layer formed on the upper side of said transparent electrode.